grade, inclusive. This is not believed to be a necessary accompaniment of school life, but a condition that may be easily remedied by cooperation of the health and educational authorities.

4. In planning exercise with a view to the promotion of good posture, it is suggested that setting-up exercises be simple and vigorous and play full of energy and vim. Formless, jellyfish gymnastics, or stupid, silly games, played half-heartedly, have little place in the proper physical development of the growing child.

STREAM POLLUTION INVESTIGATIONS.

RECOMMENDATIONS AS TO PLAN AND POLICY MADE BY UNITED STATES PUBLIC HEALTH SERVICE CONSULTANTS IN STREAM POLLUTION INVESTIGATION WORK.

For a number of years past, the Public Health Service has been engaged in a fairly extensive study of problems relating to the sewage pollution of interstate and navigable waterways. The work undertaken has comprised laboratory studies of the fundamental biochemistry of sewage disposal and water-purification; experimental studies of methods for the treatment of sewage and industrial wastes; fairly extensive studies of sewage disposal by dilution in several typical waterways; surveys of the pollution of coastal waters, with special reference to contamination of shellfish; and cooperation with States and municipalities in the study of a number of local problems. In the summer of 1921, upon request of the Surgeon General, Dr. Stephen A. Forbes, professor of biology, University of Illinois, Dr. Edwin O. Jordan, professor of hygiene and bacteriology, University of Chicago, and Mr. Langdon Pearse, sanitary engineer for the Sanitary District of Chicago, very generously consented to serve as consultants. Since their appointment, these consultants have been in close touch with the work now in progress, through periodic conferences with the officers of the Public Health Service engaged in the field work, and reports of current progress.

Desiring to obtain the benefit of their advice in the further development of this work, the Surgeon General recently requested them to submit a full and free expression of their opinion as to the general lines to be followed in future work, quite independent of the plans at present being pursued. The joint memorandum which follows, submitted in compliance with his request, is published in the belief that it will be of considerable interest to State officials, sanitary engineers, and others actively concerned with the problems of stream pollution.

MEMORANDUM.

In accordance with your request of March 25, 1922, we have thoroughly canvassed the questions put before us by your letter, relating to the general plan and policy to be followed in the stream-

pollution investigations of your service. We are agreed in submitting the following for your consideration, as an expression of our joint opinion.

The act under which the United States Public Health Service operates provides:

> The Public Health Service may study and investigate the diseases of man and conditions influencing the propagation and spread thereof, including sanitation and sewage and the pollution, either directly or indirectly, of the navigable streams and lakes of the United States, and it may from time to time issue information in the form of publications for the use of the public.

Under this act it would seem that the United States Public Health Service is empowered, at its discretion, to carry on research in sanitary matters, as well as in pure science. The scope is very broad. There appears to be no direct order, as the word "may" is used, not "shall." We believe that this discretion should properly be exercised and that there are legitimate functions which the service can well perform along the lines hereinafter indicated in sanitary research and field investigation.

The present and probable future resources of the service for sanitary work, both in the field and along the lines of research, would seem to be excellent, inasmuch as we believe that exercise of the proper functions of the service will keep in the organization a compact body of trained specialists in biology, chemistry, bacteriology, and allied sciences, who can indicate the proper fields of investigation for extended research.

The present status of the stream-pollution problem and its regulation in the United States is somewhat unsettled as regards any established policy throughout the country. There has been, however, a definite trend in the last 20 years towards improving the condition of streams, and, in particular, those streams in which the nuisance is marked. The tendency to-day is also towards the improvement of streams from which water supplies are taken, and further consideration is being given to the conservation of fish life by stream cleaning. The probability is that, as the country becomes more thickly populated, there will be further pressure for better stream conditions, not only from the standpoint of nuisance, but also to relieve the load upon water-treatment plants using such streams as sources of supply. In so far as the stream pollution problem itself is concerned, the status and tendency seem to be fairly clear, with a trend towards the bettering of conditions in the waterways. On the other hand, the status and tendency of regulation are somewhat clouded by the variation in the different States having authority to act within their borders. This is further complicated by the lack of police powers in many States. A general tendency seems to be to give a central body, like the State board of health, sufficient con-

trol, in a discretionary way, to advise on sanitary problems in stream pollution. There has not been, as yet, any marked inclination to follow the lead of Ohio in permitting the State to order work constructed under certain stipulated conditions. From the standpoint of regulation of industrial waste pollution, while there is considerable activity, so far this has not always led to a complete solution of the problem, owing to the cost of treatment. The industrial waste problem seems to have been one of more or less local handling, the practice of each State varying considerably. In some States no attempt is made to regulate at all. The indications are, however, that even in States containing the most industries, conditions have come to such a pass that even the industries realize that something must be done. This would seem to favor well-considered action towards regulation.

The resources of the State, municipal, and private organizations for necessary studies of stream pollution appear to be somewhat limited. Only the largest organizations have undertaken such work in the past, and then often with limited funds. Where difficulties are traceable to private organizations it would seem desirable that those organizations bear at least part of the expense of investigation. There appears to be, among the different agencies able to investigate, a lack of coordinated effort to avoid duplication of activities and to advance the work as far as possible.

It would seem that the States and municipalities had sufficient potential authority to regulate stream pollution within their respective boundaries. The responsibility for such regulation might be enlarged. As expressed above, police authority is frequently lacking. It would seem that more uniform laws and practice were desirable; in other words, cooperation of the States interested in an interstate problem through some national agency.

It therefore seems to us that the Public Health Service has, if it desires, a very definite function to perform in the handling of interstate problems of stream pollution and in the investigation of the same, as well as in the investigation of and research into the underlying principles of stream pollution, sewage treatment, water purification, and sanitary science in general. It further seems that there is a very legitimate function in the coordination of effort in interstate relations to a definite policy for all concerned. Regulation of the quality of water for interstate carriers might also properly be reviewed from time to time.

Our opinion as to the relative prominence of different lines of study is expressed in order of importance as follows:

(1) Fundamental studies of basic problems leading to results of general application; for example, studies of analytical methods, the laws of oxygen loss and replacement, the laws covering bacterial

death rates, laws governing the efficiency of filtration, the efficiency of methods of waste disposal, and the laws governing the removal of colloids, dehydration of colloids, color removal from water supplies, etc.

(2) Collective studies bringing together scattered observations; for example, assembling from various sources, material relating to stream pollution conditions, sewage treatment practice, water purification etc., utilizing data available from State and municipal organizations.

These studies should, if possible, be correlated by enough personal contact, and perhaps laboratory work, to put the methods of reporting and analysis upon a common basis. If practicable, more effort should be made towards standardization of laboratory methods and methods of reporting. In this connection, also, might well be considered the practicability of a semiannual review of the progress in the fields of sewage treatment, water purification, and sanitary science, with a view to making more easily available in brief compass the special work being carried on throughout the country, as well as summarizing progress in the work.

Detailed studies of individual interstate waterways might be made over a comparatively short period of time, say two to three months, with the primary object of advising the States concerned as to a uniform plan of regulation, as to policy, of both sewage treatment and water purification. An effort might be made to insure cooperation between the States in carrying out such joint projects.

We do not believe that it is properly a function of the service to cooperate with States and municipalities in studying specific *local* problems not involving interstate relations. Our personal opinion is that these matters should be left to local authorities, and that such a tendency toward centralization should be avoided. Further, we believe that the practice should be avoided, so far as practicable, of detailing men to serve in State or municipal positions without expense to the State or municipality concerned. The practice of detailing men to serve when paid by the State or municipality is not so objectionable, and, under certain conditions, may be very beneficial in starting a useful line of administration.

Our general feeling is that at present, with the studies on the Potomac, Ohio, and Illinois Rivers, the service will have obtained a mass of data on stream pollution which will be applicable to many conditions. We believe the next steps might well be to investigate the loading of water filtration plants in more detail than in the past, and to study the relation of sewage treatment to water purification. In this connection, standards for water supply may well be considered. A beginning in the study of the basic laws

covering the chemistry and bacteriology of the treatment of water and sewage might well be made. In all this work, the investigation should be directed to work along lines leading to some practical application as well as to purely scientific research.

These notes are necessarily somewhat brief. The program for the next year or two, we shall be glad to discuss more fully with the officers engaged in field work, if you desire, as opportunity permits. We feel that there is an ample field of effort open, in which there may be secured results of value to the public health of the Nation.

STEPHEN A. FORBES.
EDWIN O. JORDAN.
LANGDON PEARSE.

MEASLES.[1]

By W. C. RUCKER, Surgeon, United States Public Health Service.

About 10,000 American children died of measles in the year 1920. This does not include a large number who died of broncho-pneumonia, a great number of cases of which, in children, are caused by measles. Approximately 60 per cent of all deaths from broncho-pneumonia occur in children under 5 years of age, a time of life when measles is most likely to occur. But the story of the ravages of this disease is not complete without the mention of the large number of cases of tuberculosis which follow an attack of it. Less frequently inflammation of the ear or the eye may be left behind as a mark of a visitation of this common disease. From a public health standpoint, then, measles is a disease of prime importance.

Long association with a disease breeds a contempt for it, and measles, in common with the other diseases of childhood, has come to be looked upon as an unavoidable accompaniment of youth.

Each autumn when school opens there is an increase in the number of cases of measles, and as the season progresses they gradually increase, and winter frequently sees the disease spreading in epidemic form. Hirsch has collected data of 309 epidemics of measles, and has classified them according to season; summer had 43, autumn had 76, winter had 96, and spring had 94 epidemics.

Measles is a disease of close association; hence its increase during the colder months.

Frequently a child will go to a party and engage in innocent games in which children are brought in close contact with one another. Perhaps among the guests there is one with reddened, watery, eyes, which are sensitive to light. The eyelids are perhaps a little puffy, and the guest has a hard, high-pitched cough. The other children

[1] Revision of Supplement No. 1 to the Public Health Reports, Jan. 24, 1913.